

### AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

#### LISTING OF THE CLAIMS

1. (currently amended) An apparatus for sensing a concentration of vaporized hydrogen peroxide, comprising:

a sensing element comprised of an electroactive material, wherein said sensing element is exposed to vaporized hydrogen peroxide inside a chamber; ~~and~~

means for generating an electrical current that passes through the sensing element, said electrical current heating the electroactive material; and

means for determining a change in an electrical property of the electroactive material as the electrical current passes through the sensing element, wherein said change in the electrical property varies in accordance with a change in the concentration of the vaporized hydrogen peroxide in the chamber.

2. (original) An apparatus according to claim 1, wherein said electroactive material includes an electroactive polymer.

3. (original) An apparatus according to claim 2, wherein said electroactive polymer is polyacetylene.

4. (original) An apparatus according to claim 2, wherein said electroactive polymer is doped with a dopant reactive with vaporized hydrogen peroxide.

5. (original) An apparatus according to claim 4, wherein said dopant is iodine.

6. (original) An apparatus according to claim 1, wherein said electroactive material includes pitch-based carbon/graphite fibers.

7. (original) An apparatus according to claim 6, wherein said pitch-based carbon/graphite fibers are intercalated with bromine molecules.

Claims 8-9 (canceled).

10. (original) An apparatus according to claim 1, wherein said apparatus further comprises:

memory means for storing a plurality of data sets in a memory, wherein said data sets includes a value indicative of said electrical property as a function of time exposure to vaporized hydrogen peroxide.

11. (original) An apparatus according to claim 10, wherein said value is a slope.

12. (original) An apparatus according to claim 10, wherein said apparatus further comprises:

means for interpolating or extrapolating data from the plurality of data sets stored in a memory.

13. (currently amended) A method for sensing a concentration of vaporized hydrogen peroxide, the method comprising:

exposing a sensing element to vaporized hydrogen peroxide inside a chamber, wherein said sensing element includes an electroactive material; ~~and~~

passing an electrical current through the sensing element to measure an electrical property of the electroactive material, wherein the electrical current causes heating of the electroactive material; and

determining a change in ~~[[an]]~~the electrical property of the electroactive material, wherein said change in the electrical property varies in accordance with a change in the concentration of the vaporized hydrogen peroxide in the chamber.

14. (original) A method according to claim 13, wherein said electroactive material includes an electroactive polymer.

15. (original) A method according to claim 14, wherein said electroactive polymer is polyacetylene.

16. (original) A method according to claim 14, wherein said electroactive polymer is doped with a dopant reactive with vaporized hydrogen peroxide.

17. (original) A method according to claim 16, wherein said dopant is iodine.

18. (original) A method according to claim 13, wherein said electroactive material includes pitch-based carbon/graphite fibers.

19. (original) A method according to claim 18, wherein said pitch-based carbon/graphite fibers are intercalated with bromine molecules.

Claims 20-21 (canceled).

22. (original) A method according to claim 13, wherein said method further comprises the step of:

storing a plurality of data sets in a memory, wherein said data sets include a value indicative of said electrical property as a function of time exposure to vaporized hydrogen peroxide.

23. (original) A method according to claim 22, wherein said value is a slope.

24. (original) A method according to claim 22, wherein said method further comprises the step of:

interpolating or extrapolating data from the plurality of data sets stored in a memory.

Claims 25-44 (canceled).

45. (currently amended) A method for sensing a concentration of a chemical component in a chamber, the method comprising:

exposing a sensing element to the chemical component inside the chamber, wherein said sensing element includes an electroactive material;

passing an electrical current through the sensing element to measure an electrical property of the electroactive material, wherein the electrical current causes heating of the electroactive material;

determining a change in ~~[[an]]~~the electrical property of the electroactive material, wherein said change in the electrical property varies in accordance with a change in the concentration of the chemical component in the chamber; and

storing a plurality of data sets in a memory, wherein said data sets include a value indicative of said electrical property as a function of time exposure to the chemical component.

46. (original) A method according to claim 45, wherein said chemical component is selected from the group consisting of: gaseous or vaporous sterilants, and liquid sterilants.

47. (original) A method according to claim 45, wherein said chemical component is selected from the group consisting of: vaporized hydrogen peroxide, vaporized bleach, vaporized peracid, vaporized peracetic acid, ozone, ethylene oxide, chlorine dioxide, halogen containing compounds, and mixtures thereof.

48. (original) A method according to claim 47, wherein said halogen containing compound includes a halogen selected from the group consisting of: chlorine, fluorine and bromine.

49. (original) A method according to claim 45, wherein said electroactive material is an electroactive polymer.

50. (original) A method according to claim 49, wherein said electroactive polymer is polyacetylene.

51. (original) A method according to claim 45, wherein said electroactive material is doped with a dopant reactive with the chemical component.

52. (original) A method according to claim 51, wherein said dopant is iodine.

53. (original) A method according to claim 45, wherein said electroactive material includes pitch-based carbon/graphite fibers.

54. (original) A method according to claim 53, wherein said pitch-based carbon/graphite fibers are intercalated with bromine molecules.

Claims 55-57 (canceled).

58. (currently amended) A method according to ~~claim 57~~claim 45, wherein said value is a slope.

59. (currently amended) A method according to ~~claim 57~~claim 45, wherein said method further comprises the step of:

interpolating or extrapolating data from the plurality of data sets stored in said memory.

60. (original) A method according to claim 45, wherein at least a portion of said electroactive material includes an amorphous region.